

PIACER

Piattaforma
Progettazione
Gestione

Comunità
Energetiche
Rinnovabili

PIACER – Secondo Meeting di Progetto

Teams



Attività svolta dal CIRI FRAME

23/01/2025

Luca Cerami





**Francesco
Melino**



**Andrea
De Pascale**



**Lisa
Branchini**



**Alessandra
Ancona**



**Michele
Bianchi**



**Antonio
Peretto**

***SMEA – Sistemi e
Macchine per
l’Energia e
l’Ambiente***



**Chiara
Poletto**



**Francesco
Falcetelli**



**Federico
Ferrari**



**Riccardo
Adinolfi**



**Riccardo
Alleori**



**Luca
Cerami**



**Anna
Dattilo**



**Bruno
Cavuoti**

***LISEP – Power System
Laboratory***

***EEA – Elettrotecnica
per l’Energia e
l’Ambiente***

WP1 - Coordinamento e Gestione

- **LEAP**, CIDEA, CIRI FRAME, MECHLAV, ENEA CROSS-TEC

WP2 – Specifiche piattaforma e tool

- **CIRI FRAME**, LEAP, CIDEA, MECHLAV, ENEA CROSS-TEC

WP3 - Sviluppo tool

- **CIDEA**, CIRI FRAME, LEAP, MECHLAV, ENEA CROSS-TEC

WP4 - Demo ed exploitation

- **MECHLAV**, CIDEA, CIRI FRAME, LEAP, ENEA CROSS-TEC

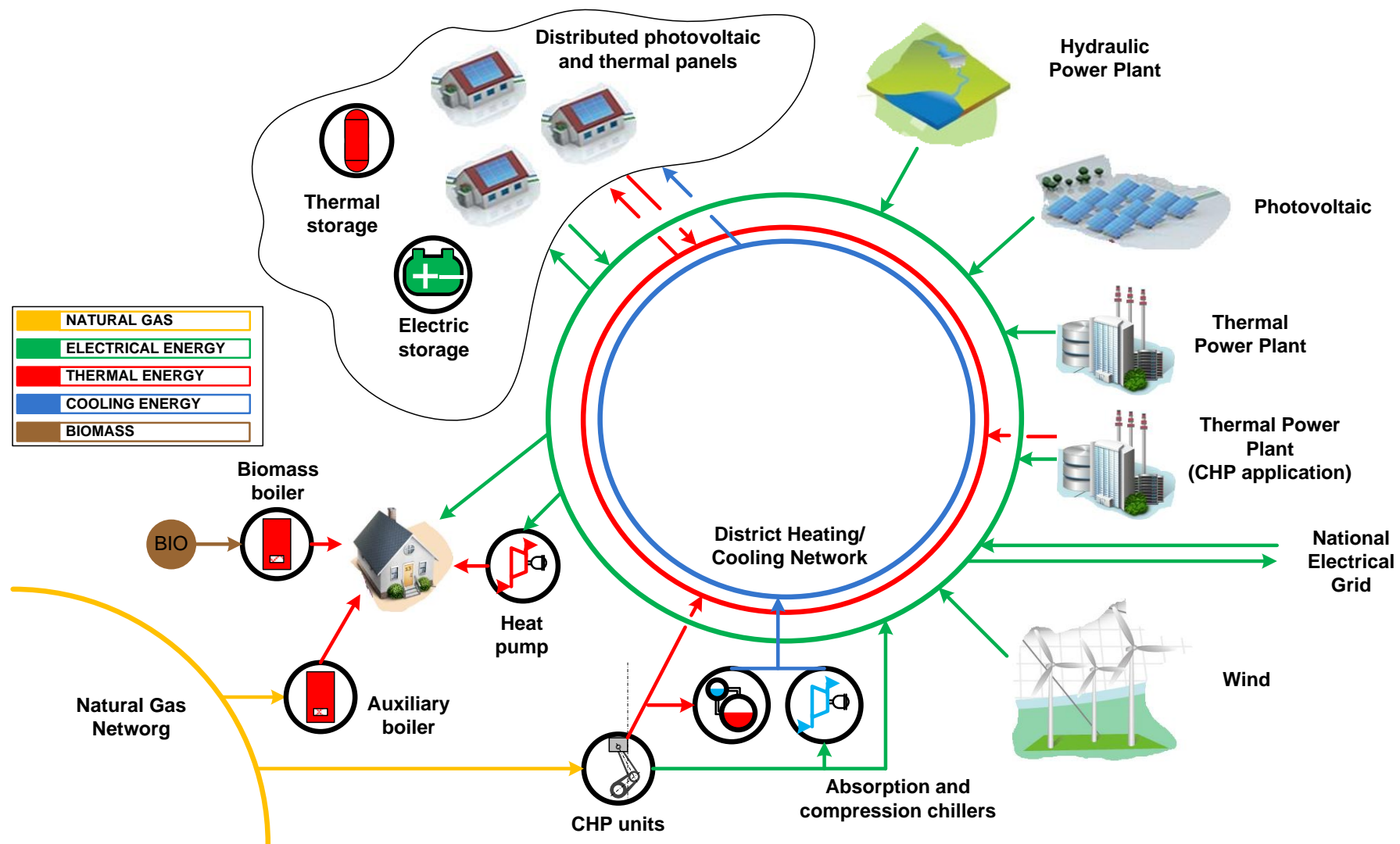
WP5 – Diffusione

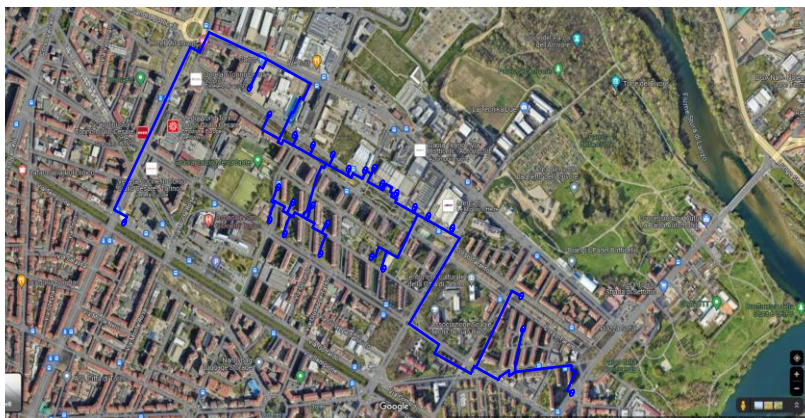
- **LEAP**, CIDEA, CIRI FRAME, MECHLAV, ENEA CROSS-TEC

CIRI-FRAME

OBIETTIVO:

Sviluppare un modello di calcolo al fine di valutare il **coupling di reti energetiche diverse** in una Comunità Energetica Rinnovabile.

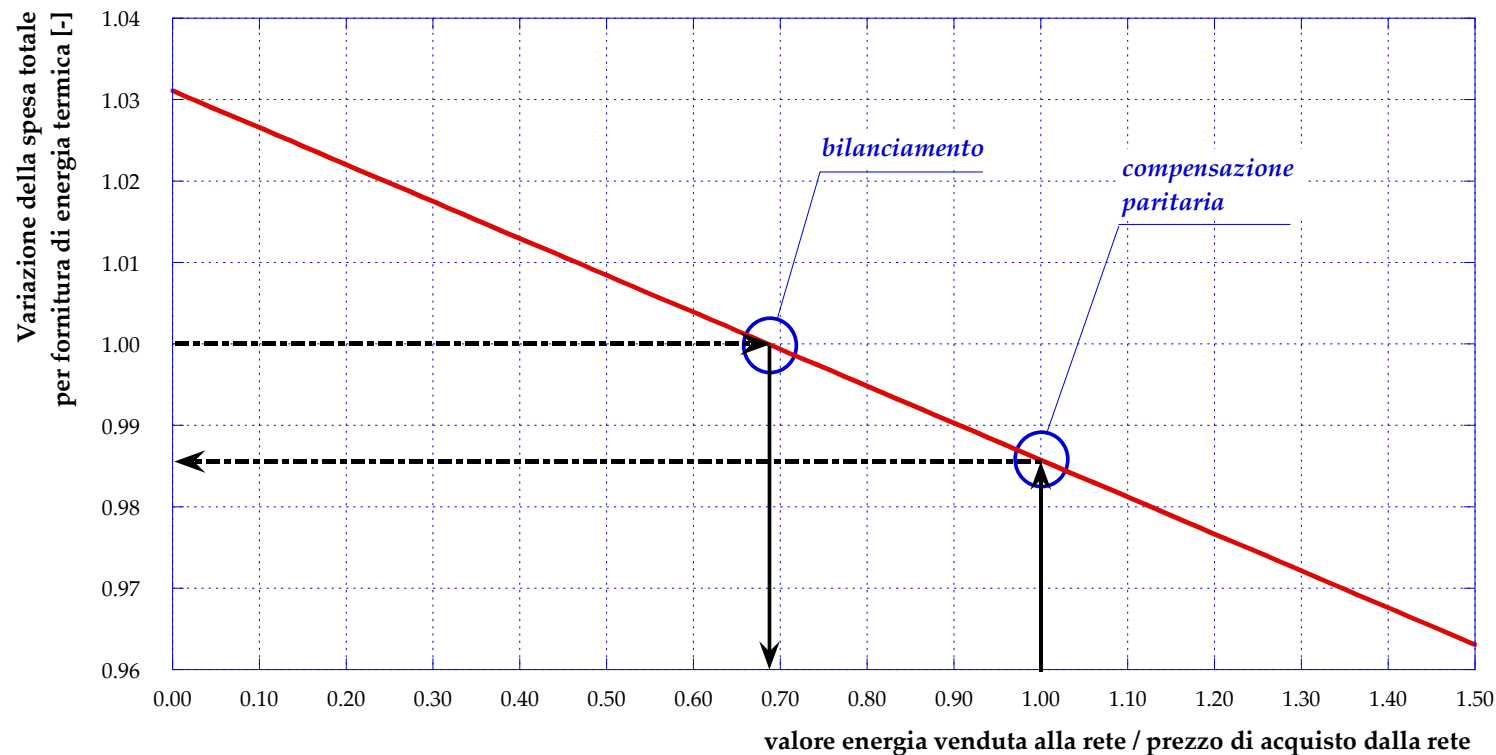




CASO STUDIO:

Rete di teleriscaldamento di Torino

Valutazione economica di un'utenza prosumer in funzione del valore dell'energia venduta alla rete.



SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software

ID#	time step (ora)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																																																										
T	Tariffe Energia																																																																																																		
0	TOTAL EVA OKI	-6,478 €	EC [%] 38%	<table border="1"> <tr><td>RSEth_tot [€]</td><td>0</td></tr> <tr><td>RSEel_tot [€]</td><td>-6,436</td></tr> <tr><td>RSEfr_tot [€]</td><td>0</td></tr> <tr><td>RSEfuel_tot [€]</td><td>-42</td></tr> </table>	RSEth_tot [€]	0	RSEel_tot [€]	-6,436	RSEfr_tot [€]	0	RSEfuel_tot [€]	-42	<table border="1"> <tr><td>APh [%]</td><td>100%</td></tr> <tr><td>APel [%]</td><td>0%</td></tr> <tr><td>APfr [%]</td><td>100%</td></tr> <tr><td>APfuel [%]</td><td>0%</td></tr> </table>	APh [%]	100%	APel [%]	0%	APfr [%]	100%	APfuel [%]	0%	<table border="1"> <tr><td>QRh [%]</td><td>100%</td></tr> <tr><td>QRel [%]</td><td>0%</td></tr> <tr><td>QRfr [%]</td><td>0%</td></tr> <tr><td>QRfuel [%]</td><td>0%</td></tr> </table>	QRh [%]	100%	QRel [%]	0%	QRfr [%]	0%	QRfuel [%]	0%	<table border="1"> <tr><td>EthR-UT [kWh]</td><td>8,974</td></tr> <tr><td>EelR-UT [kWh]</td><td>31,446</td></tr> <tr><td>EfrR-UT [kWh]</td><td>97,783</td></tr> <tr><td>EfuelR-UT [kWh]</td><td>1,219</td></tr> </table>	EthR-UT [kWh]	8,974	EelR-UT [kWh]	31,446	EfrR-UT [kWh]	97,783	EfuelR-UT [kWh]	1,219	<table border="1"> <tr><td>EthR-tot [kWh]</td><td>8,974</td></tr> <tr><td>EelR-tot [kWh]</td><td>55,891</td></tr> <tr><td>EfrR-tot [kWh]</td><td>97,783</td></tr> <tr><td>EfuelR-tot [kWh]</td><td>1,219</td></tr> </table>	EthR-tot [kWh]	8,974	EelR-tot [kWh]	55,891	EfrR-tot [kWh]	97,783	EfuelR-tot [kWh]	1,219	<table border="1"> <tr><td>Eth-P-tot [kWh]</td><td>10,369</td></tr> <tr><td>Eel-P-tot [kWh]</td><td>0</td></tr> <tr><td>Efr-P-tot [kWh]</td><td>97,783</td></tr> <tr><td>Efuel-P-tot [kWh]</td><td>0</td></tr> </table>	Eth-P-tot [kWh]	10,369	Eel-P-tot [kWh]	0	Efr-P-tot [kWh]	97,783	Efuel-P-tot [kWh]	0	<table border="1"> <tr><td>Eth-P-acc [kWh]</td><td>5,284</td></tr> <tr><td>Eth-P-acc [kWh]</td><td>5,343</td></tr> <tr><td>Eth-P-acc [kWh]</td><td>1,336</td></tr> <tr><td>Eth-acc [kWh]</td><td>58</td></tr> </table>	Eth-P-acc [kWh]	5,284	Eth-P-acc [kWh]	5,343	Eth-P-acc [kWh]	1,336	Eth-acc [kWh]	58	<table border="1"> <tr><td>Eth-TN [kWh]</td><td>0</td></tr> <tr><td>Eel-TN [kWh]</td><td>55,891</td></tr> <tr><td>Efr-TN [kWh]</td><td>0</td></tr> <tr><td>Efuel-TN [kWh]</td><td>0</td></tr> </table>	Eth-TN [kWh]	0	Eel-TN [kWh]	55,891	Efr-TN [kWh]	0	Efuel-TN [kWh]	0	<table border="1"> <tr><td>Eth-TN [kWh]</td><td>0</td></tr> <tr><td>Eel-TN [kWh]</td><td>0</td></tr> <tr><td>Efr-TN [kWh]</td><td>0</td></tr> <tr><td>Efuel-TN [kWh]</td><td>0</td></tr> </table>	Eth-TN [kWh]	0	Eel-TN [kWh]	0	Efr-TN [kWh]	0	Efuel-TN [kWh]	0															
RSEth_tot [€]	0																																																																																																		
RSEel_tot [€]	-6,436																																																																																																		
RSEfr_tot [€]	0																																																																																																		
RSEfuel_tot [€]	-42																																																																																																		
APh [%]	100%																																																																																																		
APel [%]	0%																																																																																																		
APfr [%]	100%																																																																																																		
APfuel [%]	0%																																																																																																		
QRh [%]	100%																																																																																																		
QRel [%]	0%																																																																																																		
QRfr [%]	0%																																																																																																		
QRfuel [%]	0%																																																																																																		
EthR-UT [kWh]	8,974																																																																																																		
EelR-UT [kWh]	31,446																																																																																																		
EfrR-UT [kWh]	97,783																																																																																																		
EfuelR-UT [kWh]	1,219																																																																																																		
EthR-tot [kWh]	8,974																																																																																																		
EelR-tot [kWh]	55,891																																																																																																		
EfrR-tot [kWh]	97,783																																																																																																		
EfuelR-tot [kWh]	1,219																																																																																																		
Eth-P-tot [kWh]	10,369																																																																																																		
Eel-P-tot [kWh]	0																																																																																																		
Efr-P-tot [kWh]	97,783																																																																																																		
Efuel-P-tot [kWh]	0																																																																																																		
Eth-P-acc [kWh]	5,284																																																																																																		
Eth-P-acc [kWh]	5,343																																																																																																		
Eth-P-acc [kWh]	1,336																																																																																																		
Eth-acc [kWh]	58																																																																																																		
Eth-TN [kWh]	0																																																																																																		
Eel-TN [kWh]	55,891																																																																																																		
Efr-TN [kWh]	0																																																																																																		
Efuel-TN [kWh]	0																																																																																																		
Eth-TN [kWh]	0																																																																																																		
Eel-TN [kWh]	0																																																																																																		
Efr-TN [kWh]	0																																																																																																		
Efuel-TN [kWh]	0																																																																																																		
1	includi utenza	-259 €	EC [%] 38%	<table border="1"> <tr><td>Check Mix</td><td>OKI</td></tr> <tr><td>Produttivo</td><td></td></tr> </table>	Check Mix	OKI	Produttivo		<table border="1"> <tr><td>PV</td><td>escluso</td><td>ST</td><td>incluso (on)</td><td>FR-ASS</td><td>escluso</td></tr> <tr><td>CG</td><td>escluso</td><td>PAC</td><td>escluso</td><td>FR-CMP</td><td>incluso (on)</td></tr> <tr><td>ORC</td><td>escluso</td><td>R-TH</td><td>ESCLUDI IMMISSIONE</td><td></td><td></td></tr> <tr><td></td><td></td><td>R-TH</td><td>NO SCAMBIO SUL POSTO</td><td></td><td></td></tr> </table>	PV	escluso	ST	incluso (on)	FR-ASS	escluso	CG	escluso	PAC	escluso	FR-CMP	incluso (on)	ORC	escluso	R-TH	ESCLUDI IMMISSIONE					R-TH	NO SCAMBIO SUL POSTO			<table border="1"> <tr><td>RSEth_tot [€]</td><td>0</td></tr> <tr><td>RSEel_tot [€]</td><td>-257</td></tr> <tr><td>RSEfr_tot [€]</td><td>0</td></tr> <tr><td>RSEfuel_tot [€]</td><td>-2</td></tr> </table>	RSEth_tot [€]	0	RSEel_tot [€]	-257	RSEfr_tot [€]	0	RSEfuel_tot [€]	-2	<table border="1"> <tr><td>APh [%]</td><td>100%</td></tr> <tr><td>APel [%]</td><td>0%</td></tr> <tr><td>APfr [%]</td><td>100%</td></tr> <tr><td>APfuel [%]</td><td>0%</td></tr> </table>	APh [%]	100%	APel [%]	0%	APfr [%]	100%	APfuel [%]	0%	<table border="1"> <tr><td>QRh [%]</td><td>100%</td></tr> <tr><td>QRel [%]</td><td>0%</td></tr> <tr><td>QRfr [%]</td><td>0%</td></tr> <tr><td>QRfuel [%]</td><td>0%</td></tr> </table>	QRh [%]	100%	QRel [%]	0%	QRfr [%]	0%	QRfuel [%]	0%	<table border="1"> <tr><td>Eth-R-UT [kWh]</td><td>359</td></tr> <tr><td>Eel-R-UT [kWh]</td><td>1,258</td></tr> <tr><td>Efr-R-UT [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-UT [kWh]</td><td>49</td></tr> </table>	Eth-R-UT [kWh]	359	Eel-R-UT [kWh]	1,258	Efr-R-UT [kWh]	3,911	Efuel-R-UT [kWh]	49	<table border="1"> <tr><td>Eth-R-tot [kWh]</td><td>359</td></tr> <tr><td>Eel-R-tot [kWh]</td><td>2,236</td></tr> <tr><td>Efr-R-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-tot [kWh]</td><td>49</td></tr> </table>	Eth-R-tot [kWh]	359	Eel-R-tot [kWh]	2,236	Efr-R-tot [kWh]	3,911	Efuel-R-tot [kWh]	49	<table border="1"> <tr><td>Eth-P-tot [kWh]</td><td>415</td></tr> <tr><td>Eel-P-tot [kWh]</td><td>0</td></tr> <tr><td>Efr-P-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-P-tot [kWh]</td><td>0</td></tr> </table>	Eth-P-tot [kWh]	415	Eel-P-tot [kWh]	0	Efr-P-tot [kWh]	3,911	Efuel-P-tot [kWh]	0												
Check Mix	OKI																																																																																																		
Produttivo																																																																																																			
PV	escluso	ST	incluso (on)	FR-ASS	escluso																																																																																														
CG	escluso	PAC	escluso	FR-CMP	incluso (on)																																																																																														
ORC	escluso	R-TH	ESCLUDI IMMISSIONE																																																																																																
		R-TH	NO SCAMBIO SUL POSTO																																																																																																
RSEth_tot [€]	0																																																																																																		
RSEel_tot [€]	-257																																																																																																		
RSEfr_tot [€]	0																																																																																																		
RSEfuel_tot [€]	-2																																																																																																		
APh [%]	100%																																																																																																		
APel [%]	0%																																																																																																		
APfr [%]	100%																																																																																																		
APfuel [%]	0%																																																																																																		
QRh [%]	100%																																																																																																		
QRel [%]	0%																																																																																																		
QRfr [%]	0%																																																																																																		
QRfuel [%]	0%																																																																																																		
Eth-R-UT [kWh]	359																																																																																																		
Eel-R-UT [kWh]	1,258																																																																																																		
Efr-R-UT [kWh]	3,911																																																																																																		
Efuel-R-UT [kWh]	49																																																																																																		
Eth-R-tot [kWh]	359																																																																																																		
Eel-R-tot [kWh]	2,236																																																																																																		
Efr-R-tot [kWh]	3,911																																																																																																		
Efuel-R-tot [kWh]	49																																																																																																		
Eth-P-tot [kWh]	415																																																																																																		
Eel-P-tot [kWh]	0																																																																																																		
Efr-P-tot [kWh]	3,911																																																																																																		
Efuel-P-tot [kWh]	0																																																																																																		
2	includi utenza	-259 €	EC [%] 38%	<table border="1"> <tr><td>Check Mix</td><td>OKI</td></tr> <tr><td>Produttivo</td><td></td></tr> </table>	Check Mix	OKI	Produttivo		<table border="1"> <tr><td>PV</td><td>escluso</td><td>ST</td><td>incluso (on)</td><td>FR-ASS</td><td>escluso</td></tr> <tr><td>CG</td><td>escluso</td><td>PAC</td><td>escluso</td><td>FR-CMP</td><td>incluso (on)</td></tr> <tr><td>ORC</td><td>escluso</td><td>R-TH</td><td>ESCLUDI IMMISSIONE</td><td></td><td></td></tr> <tr><td></td><td></td><td>R-TH</td><td>NO SCAMBIO SUL POSTO</td><td></td><td></td></tr> </table>	PV	escluso	ST	incluso (on)	FR-ASS	escluso	CG	escluso	PAC	escluso	FR-CMP	incluso (on)	ORC	escluso	R-TH	ESCLUDI IMMISSIONE					R-TH	NO SCAMBIO SUL POSTO			<table border="1"> <tr><td>RSEth_tot [€]</td><td>0</td></tr> <tr><td>RSEel_tot [€]</td><td>-257</td></tr> <tr><td>RSEfr_tot [€]</td><td>0</td></tr> <tr><td>RSEfuel_tot [€]</td><td>-2</td></tr> </table>	RSEth_tot [€]	0	RSEel_tot [€]	-257	RSEfr_tot [€]	0	RSEfuel_tot [€]	-2	<table border="1"> <tr><td>APh [%]</td><td>100%</td></tr> <tr><td>APel [%]</td><td>0%</td></tr> <tr><td>APfr [%]</td><td>100%</td></tr> <tr><td>APfuel [%]</td><td>0%</td></tr> </table>	APh [%]	100%	APel [%]	0%	APfr [%]	100%	APfuel [%]	0%	<table border="1"> <tr><td>QRh [%]</td><td>100%</td></tr> <tr><td>QRel [%]</td><td>0%</td></tr> <tr><td>QRfr [%]</td><td>0%</td></tr> <tr><td>QRfuel [%]</td><td>0%</td></tr> </table>	QRh [%]	100%	QRel [%]	0%	QRfr [%]	0%	QRfuel [%]	0%	<table border="1"> <tr><td>Eth-R-UT [kWh]</td><td>359</td></tr> <tr><td>Eel-R-UT [kWh]</td><td>1,258</td></tr> <tr><td>Efr-R-UT [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-UT [kWh]</td><td>49</td></tr> </table>	Eth-R-UT [kWh]	359	Eel-R-UT [kWh]	1,258	Efr-R-UT [kWh]	3,911	Efuel-R-UT [kWh]	49	<table border="1"> <tr><td>Eth-R-tot [kWh]</td><td>359</td></tr> <tr><td>Eel-R-tot [kWh]</td><td>2,236</td></tr> <tr><td>Efr-R-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-tot [kWh]</td><td>49</td></tr> </table>	Eth-R-tot [kWh]	359	Eel-R-tot [kWh]	2,236	Efr-R-tot [kWh]	3,911	Efuel-R-tot [kWh]	49	<table border="1"> <tr><td>Eth-P-tot [kWh]</td><td>415</td></tr> <tr><td>Eel-P-tot [kWh]</td><td>0</td></tr> <tr><td>Efr-P-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-P-tot [kWh]</td><td>0</td></tr> </table>	Eth-P-tot [kWh]	415	Eel-P-tot [kWh]	0	Efr-P-tot [kWh]	3,911	Efuel-P-tot [kWh]	0												
Check Mix	OKI																																																																																																		
Produttivo																																																																																																			
PV	escluso	ST	incluso (on)	FR-ASS	escluso																																																																																														
CG	escluso	PAC	escluso	FR-CMP	incluso (on)																																																																																														
ORC	escluso	R-TH	ESCLUDI IMMISSIONE																																																																																																
		R-TH	NO SCAMBIO SUL POSTO																																																																																																
RSEth_tot [€]	0																																																																																																		
RSEel_tot [€]	-257																																																																																																		
RSEfr_tot [€]	0																																																																																																		
RSEfuel_tot [€]	-2																																																																																																		
APh [%]	100%																																																																																																		
APel [%]	0%																																																																																																		
APfr [%]	100%																																																																																																		
APfuel [%]	0%																																																																																																		
QRh [%]	100%																																																																																																		
QRel [%]	0%																																																																																																		
QRfr [%]	0%																																																																																																		
QRfuel [%]	0%																																																																																																		
Eth-R-UT [kWh]	359																																																																																																		
Eel-R-UT [kWh]	1,258																																																																																																		
Efr-R-UT [kWh]	3,911																																																																																																		
Efuel-R-UT [kWh]	49																																																																																																		
Eth-R-tot [kWh]	359																																																																																																		
Eel-R-tot [kWh]	2,236																																																																																																		
Efr-R-tot [kWh]	3,911																																																																																																		
Efuel-R-tot [kWh]	49																																																																																																		
Eth-P-tot [kWh]	415																																																																																																		
Eel-P-tot [kWh]	0																																																																																																		
Efr-P-tot [kWh]	3,911																																																																																																		
Efuel-P-tot [kWh]	0																																																																																																		
3	includi utenza	-259 €	EC [%] 38%	<table border="1"> <tr><td>Check Mix</td><td>OKI</td></tr> <tr><td>Produttivo</td><td></td></tr> </table>	Check Mix	OKI	Produttivo		<table border="1"> <tr><td>PV</td><td>escluso</td><td>ST</td><td>incluso (on)</td><td>FR-ASS</td><td>escluso</td></tr> <tr><td>CG</td><td>escluso</td><td>PAC</td><td>escluso</td><td>FR-CMP</td><td>incluso (on)</td></tr> <tr><td>ORC</td><td>escluso</td><td>R-TH</td><td>ESCLUDI IMMISSIONE</td><td></td><td></td></tr> <tr><td></td><td></td><td>R-TH</td><td>NO SCAMBIO SUL POSTO</td><td></td><td></td></tr> </table>	PV	escluso	ST	incluso (on)	FR-ASS	escluso	CG	escluso	PAC	escluso	FR-CMP	incluso (on)	ORC	escluso	R-TH	ESCLUDI IMMISSIONE					R-TH	NO SCAMBIO SUL POSTO			<table border="1"> <tr><td>RSEth_tot [€]</td><td>0</td></tr> <tr><td>RSEel_tot [€]</td><td>-257</td></tr> <tr><td>RSEfr_tot [€]</td><td>0</td></tr> <tr><td>RSEfuel_tot [€]</td><td>-2</td></tr> </table>	RSEth_tot [€]	0	RSEel_tot [€]	-257	RSEfr_tot [€]	0	RSEfuel_tot [€]	-2	<table border="1"> <tr><td>APh [%]</td><td>100%</td></tr> <tr><td>APel [%]</td><td>0%</td></tr> <tr><td>APfr [%]</td><td>100%</td></tr> <tr><td>APfuel [%]</td><td>0%</td></tr> </table>	APh [%]	100%	APel [%]	0%	APfr [%]	100%	APfuel [%]	0%	<table border="1"> <tr><td>QRh [%]</td><td>100%</td></tr> <tr><td>QRel [%]</td><td>0%</td></tr> <tr><td>QRfr [%]</td><td>0%</td></tr> <tr><td>QRfuel [%]</td><td>0%</td></tr> </table>	QRh [%]	100%	QRel [%]	0%	QRfr [%]	0%	QRfuel [%]	0%	<table border="1"> <tr><td>Eth-R-UT [kWh]</td><td>359</td></tr> <tr><td>Eel-R-UT [kWh]</td><td>1,258</td></tr> <tr><td>Efr-R-UT [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-UT [kWh]</td><td>49</td></tr> </table>	Eth-R-UT [kWh]	359	Eel-R-UT [kWh]	1,258	Efr-R-UT [kWh]	3,911	Efuel-R-UT [kWh]	49	<table border="1"> <tr><td>Eth-R-tot [kWh]</td><td>359</td></tr> <tr><td>Eel-R-tot [kWh]</td><td>2,236</td></tr> <tr><td>Efr-R-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-tot [kWh]</td><td>49</td></tr> </table>	Eth-R-tot [kWh]	359	Eel-R-tot [kWh]	2,236	Efr-R-tot [kWh]	3,911	Efuel-R-tot [kWh]	49	<table border="1"> <tr><td>Eth-P-tot [kWh]</td><td>415</td></tr> <tr><td>Eel-P-tot [kWh]</td><td>0</td></tr> <tr><td>Efr-P-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-P-tot [kWh]</td><td>0</td></tr> </table>	Eth-P-tot [kWh]	415	Eel-P-tot [kWh]	0	Efr-P-tot [kWh]	3,911	Efuel-P-tot [kWh]	0												
Check Mix	OKI																																																																																																		
Produttivo																																																																																																			
PV	escluso	ST	incluso (on)	FR-ASS	escluso																																																																																														
CG	escluso	PAC	escluso	FR-CMP	incluso (on)																																																																																														
ORC	escluso	R-TH	ESCLUDI IMMISSIONE																																																																																																
		R-TH	NO SCAMBIO SUL POSTO																																																																																																
RSEth_tot [€]	0																																																																																																		
RSEel_tot [€]	-257																																																																																																		
RSEfr_tot [€]	0																																																																																																		
RSEfuel_tot [€]	-2																																																																																																		
APh [%]	100%																																																																																																		
APel [%]	0%																																																																																																		
APfr [%]	100%																																																																																																		
APfuel [%]	0%																																																																																																		
QRh [%]	100%																																																																																																		
QRel [%]	0%																																																																																																		
QRfr [%]	0%																																																																																																		
QRfuel [%]	0%																																																																																																		
Eth-R-UT [kWh]	359																																																																																																		
Eel-R-UT [kWh]	1,258																																																																																																		
Efr-R-UT [kWh]	3,911																																																																																																		
Efuel-R-UT [kWh]	49																																																																																																		
Eth-R-tot [kWh]	359																																																																																																		
Eel-R-tot [kWh]	2,236																																																																																																		
Efr-R-tot [kWh]	3,911																																																																																																		
Efuel-R-tot [kWh]	49																																																																																																		
Eth-P-tot [kWh]	415																																																																																																		
Eel-P-tot [kWh]	0																																																																																																		
Efr-P-tot [kWh]	3,911																																																																																																		
Efuel-P-tot [kWh]	0																																																																																																		
4	includi utenza	-259 €	EC [%] 38%	<table border="1"> <tr><td>Check Mix</td><td>OKI</td></tr> <tr><td>Produttivo</td><td></td></tr> </table>	Check Mix	OKI	Produttivo		<table border="1"> <tr><td>PV</td><td>escluso</td><td>ST</td><td>incluso (on)</td><td>FR-ASS</td><td>escluso</td></tr> <tr><td>CG</td><td>escluso</td><td>PAC</td><td>escluso</td><td>FR-CMP</td><td>incluso (on)</td></tr> <tr><td>ORC</td><td>escluso</td><td>R-TH</td><td>ESCLUDI IMMISSIONE</td><td></td><td></td></tr> <tr><td></td><td></td><td>R-TH</td><td>NO SCAMBIO SUL POSTO</td><td></td><td></td></tr> </table>	PV	escluso	ST	incluso (on)	FR-ASS	escluso	CG	escluso	PAC	escluso	FR-CMP	incluso (on)	ORC	escluso	R-TH	ESCLUDI IMMISSIONE					R-TH	NO SCAMBIO SUL POSTO			<table border="1"> <tr><td>RSEth_tot [€]</td><td>0</td></tr> <tr><td>RSEel_tot [€]</td><td>-257</td></tr> <tr><td>RSEfr_tot [€]</td><td>0</td></tr> <tr><td>RSEfuel_tot [€]</td><td>-2</td></tr> </table>	RSEth_tot [€]	0	RSEel_tot [€]	-257	RSEfr_tot [€]	0	RSEfuel_tot [€]	-2	<table border="1"> <tr><td>APh [%]</td><td>100%</td></tr> <tr><td>APel [%]</td><td>0%</td></tr> <tr><td>APfr [%]</td><td>100%</td></tr> <tr><td>APfuel [%]</td><td>0%</td></tr> </table>	APh [%]	100%	APel [%]	0%	APfr [%]	100%	APfuel [%]	0%	<table border="1"> <tr><td>QRh [%]</td><td>100%</td></tr> <tr><td>QRel [%]</td><td>0%</td></tr> <tr><td>QRfr [%]</td><td>0%</td></tr> <tr><td>QRfuel [%]</td><td>0%</td></tr> </table>	QRh [%]	100%	QRel [%]	0%	QRfr [%]	0%	QRfuel [%]	0%	<table border="1"> <tr><td>Eth-R-UT [kWh]</td><td>359</td></tr> <tr><td>Eel-R-UT [kWh]</td><td>1,258</td></tr> <tr><td>Efr-R-UT [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-UT [kWh]</td><td>49</td></tr> </table>	Eth-R-UT [kWh]	359	Eel-R-UT [kWh]	1,258	Efr-R-UT [kWh]	3,911	Efuel-R-UT [kWh]	49	<table border="1"> <tr><td>Eth-R-tot [kWh]</td><td>359</td></tr> <tr><td>Eel-R-tot [kWh]</td><td>2,236</td></tr> <tr><td>Efr-R-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-tot [kWh]</td><td>49</td></tr> </table>	Eth-R-tot [kWh]	359	Eel-R-tot [kWh]	2,236	Efr-R-tot [kWh]	3,911	Efuel-R-tot [kWh]	49	<table border="1"> <tr><td>Eth-P-tot [kWh]</td><td>415</td></tr> <tr><td>Eel-P-tot [kWh]</td><td>0</td></tr> <tr><td>Efr-P-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-P-tot [kWh]</td><td>0</td></tr> </table>	Eth-P-tot [kWh]	415	Eel-P-tot [kWh]	0	Efr-P-tot [kWh]	3,911	Efuel-P-tot [kWh]	0												
Check Mix	OKI																																																																																																		
Produttivo																																																																																																			
PV	escluso	ST	incluso (on)	FR-ASS	escluso																																																																																														
CG	escluso	PAC	escluso	FR-CMP	incluso (on)																																																																																														
ORC	escluso	R-TH	ESCLUDI IMMISSIONE																																																																																																
		R-TH	NO SCAMBIO SUL POSTO																																																																																																
RSEth_tot [€]	0																																																																																																		
RSEel_tot [€]	-257																																																																																																		
RSEfr_tot [€]	0																																																																																																		
RSEfuel_tot [€]	-2																																																																																																		
APh [%]	100%																																																																																																		
APel [%]	0%																																																																																																		
APfr [%]	100%																																																																																																		
APfuel [%]	0%																																																																																																		
QRh [%]	100%																																																																																																		
QRel [%]	0%																																																																																																		
QRfr [%]	0%																																																																																																		
QRfuel [%]	0%																																																																																																		
Eth-R-UT [kWh]	359																																																																																																		
Eel-R-UT [kWh]	1,258																																																																																																		
Efr-R-UT [kWh]	3,911																																																																																																		
Efuel-R-UT [kWh]	49																																																																																																		
Eth-R-tot [kWh]	359																																																																																																		
Eel-R-tot [kWh]	2,236																																																																																																		
Efr-R-tot [kWh]	3,911																																																																																																		
Efuel-R-tot [kWh]	49																																																																																																		
Eth-P-tot [kWh]	415																																																																																																		
Eel-P-tot [kWh]	0																																																																																																		
Efr-P-tot [kWh]	3,911																																																																																																		
Efuel-P-tot [kWh]	0																																																																																																		
5	includi utenza	-259 €	EC [%] 38%	<table border="1"> <tr><td>Check Mix</td><td>OKI</td></tr> <tr><td>Produttivo</td><td></td></tr> </table>	Check Mix	OKI	Produttivo		<table border="1"> <tr><td>PV</td><td>escluso</td><td>ST</td><td>incluso (on)</td><td>FR-ASS</td><td>escluso</td></tr> <tr><td>CG</td><td>escluso</td><td>PAC</td><td>escluso</td><td>FR-CMP</td><td>incluso (on)</td></tr> <tr><td>ORC</td><td>escluso</td><td>R-TH</td><td>ESCLUDI IMMISSIONE</td><td></td><td></td></tr> <tr><td></td><td></td><td>R-TH</td><td>NO SCAMBIO SUL POSTO</td><td></td><td></td></tr> </table>	PV	escluso	ST	incluso (on)	FR-ASS	escluso	CG	escluso	PAC	escluso	FR-CMP	incluso (on)	ORC	escluso	R-TH	ESCLUDI IMMISSIONE					R-TH	NO SCAMBIO SUL POSTO			<table border="1"> <tr><td>RSEth_tot [€]</td><td>0</td></tr> <tr><td>RSEel_tot [€]</td><td>-257</td></tr> <tr><td>RSEfr_tot [€]</td><td>0</td></tr> <tr><td>RSEfuel_tot [€]</td><td>-2</td></tr> </table>	RSEth_tot [€]	0	RSEel_tot [€]	-257	RSEfr_tot [€]	0	RSEfuel_tot [€]	-2	<table border="1"> <tr><td>APh [%]</td><td>100%</td></tr> <tr><td>APel [%]</td><td>0%</td></tr> <tr><td>APfr [%]</td><td>100%</td></tr> <tr><td>APfuel [%]</td><td>0%</td></tr> </table>	APh [%]	100%	APel [%]	0%	APfr [%]	100%	APfuel [%]	0%	<table border="1"> <tr><td>QRh [%]</td><td>100%</td></tr> <tr><td>QRel [%]</td><td>0%</td></tr> <tr><td>QRfr [%]</td><td>0%</td></tr> <tr><td>QRfuel [%]</td><td>0%</td></tr> </table>	QRh [%]	100%	QRel [%]	0%	QRfr [%]	0%	QRfuel [%]	0%	<table border="1"> <tr><td>Eth-R-UT [kWh]</td><td>359</td></tr> <tr><td>Eel-R-UT [kWh]</td><td>1,258</td></tr> <tr><td>Efr-R-UT [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-UT [kWh]</td><td>49</td></tr> </table>	Eth-R-UT [kWh]	359	Eel-R-UT [kWh]	1,258	Efr-R-UT [kWh]	3,911	Efuel-R-UT [kWh]	49	<table border="1"> <tr><td>Eth-R-tot [kWh]</td><td>359</td></tr> <tr><td>Eel-R-tot [kWh]</td><td>2,236</td></tr> <tr><td>Efr-R-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-R-tot [kWh]</td><td>49</td></tr> </table>	Eth-R-tot [kWh]	359	Eel-R-tot [kWh]	2,236	Efr-R-tot [kWh]	3,911	Efuel-R-tot [kWh]	49	<table border="1"> <tr><td>Eth-P-tot [kWh]</td><td>415</td></tr> <tr><td>Eel-P-tot [kWh]</td><td>0</td></tr> <tr><td>Efr-P-tot [kWh]</td><td>3,911</td></tr> <tr><td>Efuel-P-tot [kWh]</td><td>0</td></tr> </table>	Eth-P-tot [kWh]	415	Eel-P-tot [kWh]	0	Efr-P-tot [kWh]	3,911	Efuel-P-tot [kWh]	0												
Check Mix	OKI																																																																																																		
Produttivo																																																																																																			
PV	escluso	ST	incluso (on)	FR-ASS	escluso																																																																																														
CG	escluso	PAC	escluso	FR-CMP	incluso (on)																																																																																														
ORC	escluso	R-TH	ESCLUDI IMMISSIONE																																																																																																
		R-TH	NO SCAMBIO SUL POSTO																																																																																																
RSEth_tot [€]	0																																																																																																		
RSEel_tot [€]	-257																																																																																																		
RSEfr_tot [€]	0																																																																																																		
RSEfuel_tot [€]	-2																																																																																																		
APh [%]	100%																																																																																																		
APel [%]	0%																																																																																																		
APfr [%]	100%																																																																																																		
APfuel [%]	0%																																																																																																		
QRh [%]	100%																																																																																																		
QRel [%]	0%																																																																																																		
QRfr [%]	0%																																																																																																		
QRfuel [%]	0%																																																																																																		
Eth-R-UT [kWh]	359																																																																																																		
Eel-R-UT [kWh]	1,258																																																																																																		
Efr-R-UT [kWh]	3,911																																																																																																		
Efuel-R-UT [kWh]	49																																																																																																		
Eth-R-tot [kWh]	359																																																																																																		
Eel-R-tot [kWh]	2,236																																																																																																		
Efr-R-tot [kWh]	3,911																																																																																																		
Efuel-R-tot [kWh]	49																																																																																																		
Eth-P-tot [kWh]	415																																																																																																		
Eel-P-tot [kWh]	0																																																																																																		
Efr-P-tot [kWh]	3,911																																																																																																		
Efuel-P-tot [kWh]	0																																																																																																		

SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software

INPUT PRINCIPALI

Carica INPUT	ID utenza	1	2	3	4	5
ESTATE		RESIDENZIALE	RESIDENZIALE	SUPERMARKET	CINEMA	OSPEDALE
PeI,R-UT,max [kW]		67	67	618	13	86
Pth,R-UT,max [kW]		317	317	490	105	633
Pfr,R-UT,max [kW]		159	159	185	60	80
Pfuel,R-UT,max [kW]		7	7	0	0	0
PeI,P-PV,max [kW]		40	40	46	15	20
Pth,P-ST,max [kW]		150	150	175	57	76
PeI,P-CG,max [kW]		0	0	0	0	0
Pth,P-CG,max [kW]		0	0	0	0	0
ETAel,CG,max [-]		0	0	0	0	0
EER-ASS,max [-]		0,67	0,67	0,67	0,67	0,67
EER-CMP,max [-]		4,00	4,00	4,00	4,00	4,00
COP-PdC,max [-]		5,00	5,00	5,00	5,00	5,00
Pth,TTN,min [kW]		24	24	24	24	24
ETAel,ORC,max [-]		0,10	0,10	0,10	0,10	0,10
ETAth,acc [-]		0,80	0,80	0,80	0,80	0,80

SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software

INPUT PRINCIPALI

TIPOLOGIA DI CARICO:

- RESIDENZIALE
- SUPERMARKET
- CINEMA
- OSPEDALE
- SCUOLA

Carica INPUT	ID utenza	1	2	3	4	5
ESTATE		RESIDENZIALE	RESIDENZIALE	SUPERMARKET	CINEMA	OSPEDALE
$P_{el,R-UT,max}$ [kW]		67	67	618	13	86
$P_{th,R-UT,max}$ [kW]		317	317	490	105	633
$P_{fr,R-UT,max}$ [kW]		159	159	185	60	80
$P_{fuel,R-UT,max}$ [kW]		7	7	0	0	0
$P_{el,P-PV,max}$ [kW]		40	40	46	15	20
$P_{th,P-ST,max}$ [kW]		150	150	175	57	76
$P_{el,P-CG,max}$ [kW]		0	0	0	0	0
$P_{th,P-CG,max}$ [kW]		0	0	0	0	0
$ETA_{el,CG,max}$ [-]		0	0	0	0	0
$EER-ASS,max$ [-]		0,67	0,67	0,67	0,67	0,67
$EER-CMP,max$ [-]		4,00	4,00	4,00	4,00	4,00
$COP-PdC,max$ [-]		5,00	5,00	5,00	5,00	5,00
$P_{th,TTN,min}$ [kW]		24	24	24	24	24
$ETA_{el,ORC,max}$ [-]		0,10	0,10	0,10	0,10	0,10
$ETA_{th,acc}$ [-]		0,80	0,80	0,80	0,80	0,80

SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software

INPUT PRINCIPALI

STAGIONE:

- ESTATE
- INVERNO
- MEZZA STAGIONE

Carica INPUT	ID utenza	1	2	3	4	5
ESTATE		RESIDENZIALE	RESIDENZIALE	SUPERMARKET	CINEMA	OSPEDALE
PeI,R-UT,max [kW]		67	67	618	13	86
Pth,R-UT,max [kW]		317	317	490	105	633
Pfr,R-UT,max [kW]		159	159	185	60	80
Pfuel,R-UT,max [kW]		7	7	0	0	0
PeI,P-PV,max [kW]		40	40	46	15	20
Pth,P-ST,max [kW]		150	150	175	57	76
PeI,P-CG,max [kW]		0	0	0	0	0
Pth,P-CG,max [kW]		0	0	0	0	0
ETAel,CG,max [-]		0	0	0	0	0
EER-ASS,max [-]		0,67	0,67	0,67	0,67	0,67
EER-CMP,max [-]		4,00	4,00	4,00	4,00	4,00
COP-PdC,max [-]		5,00	5,00	5,00	5,00	5,00
Pth,TTN,min [kW]		24	24	24	24	24
ETAel,ORC,max [-]		0,10	0,10	0,10	0,10	0,10
ETAth,acc [-]		0,80	0,80	0,80	0,80	0,80

SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software

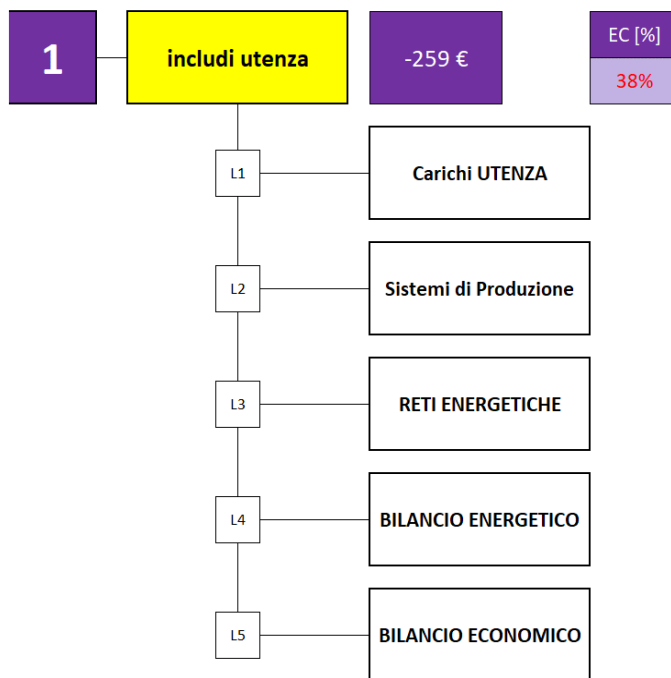
INPUT PRINCIPALI

**CARATTERISTICHE
SISTEMI
DI
PRODUZIONE**

Carica INPUT	ID utenza	1	2	3	4	5
ESTATE		RESIDENZIALE	RESIDENZIALE	SUPERMARKET	CINEMA	OSPEDALE
PeI,R-UT,max [kW]		67	67	618	13	86
Pth,R-UT,max [kW]		317	317	490	105	633
Pfr,R-UT,max [kW]		159	159	185	60	80
Pfuel,R-UT,max [kW]		7	7	0	0	0
PeI,P-PV,max [kW]		40	40	46	15	20
Pth,P-ST,max [kW]		150	150	175	57	76
PeI,P-CG,max [kW]		0	0	0	0	0
Pth,P-CG,max [kW]		0	0	0	0	0
ETAel,CG,max [-]		0	0	0	0	0
EER-ASS,max [-]		0,67	0,67	0,67	0,67	0,67
EER-CMP,max [-]		4,00	4,00	4,00	4,00	4,00
COP-PdC,max [-]		5,00	5,00	5,00	5,00	5,00
Pth,TTN,min [kW]		24	24	24	24	24
ETAel,ORC,max [-]		0,10	0,10	0,10	0,10	0,10
ETAth,acc [-]		0,80	0,80	0,80	0,80	0,80

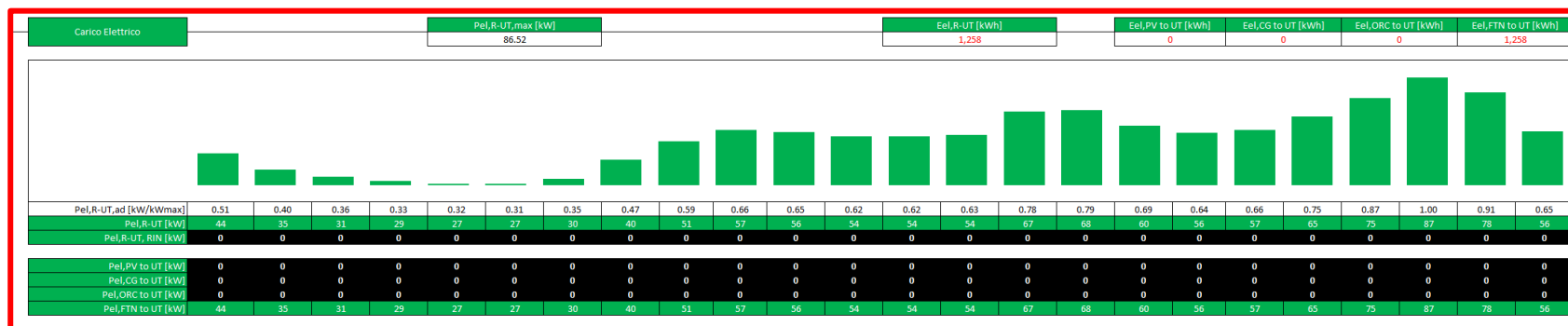
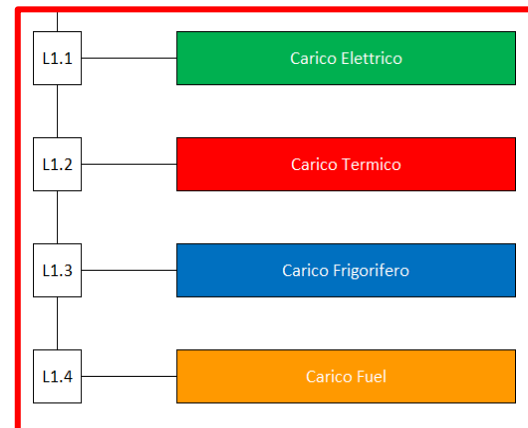
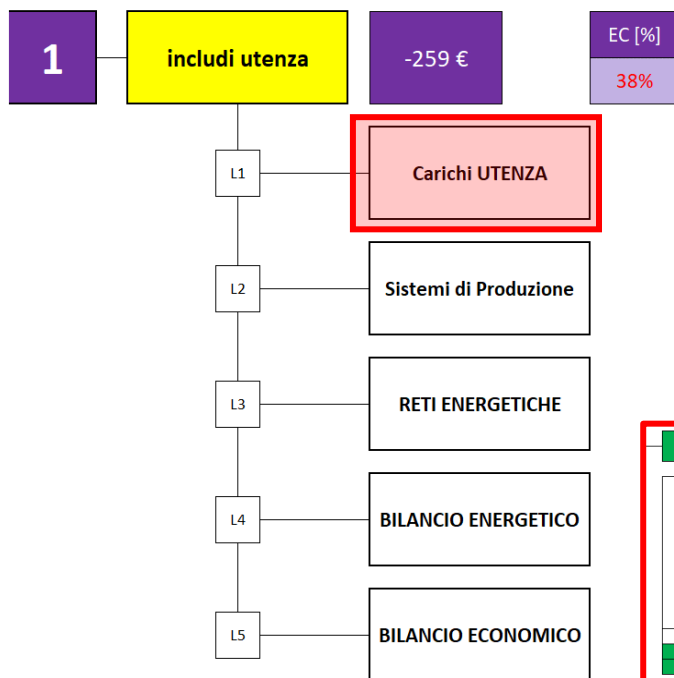
SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software



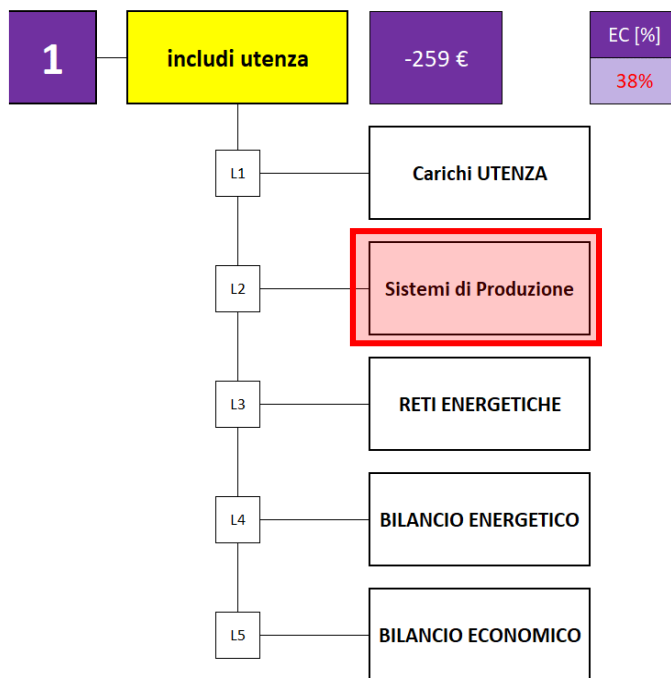
SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software



SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software



MIX PRODUTTIVO UTENZA

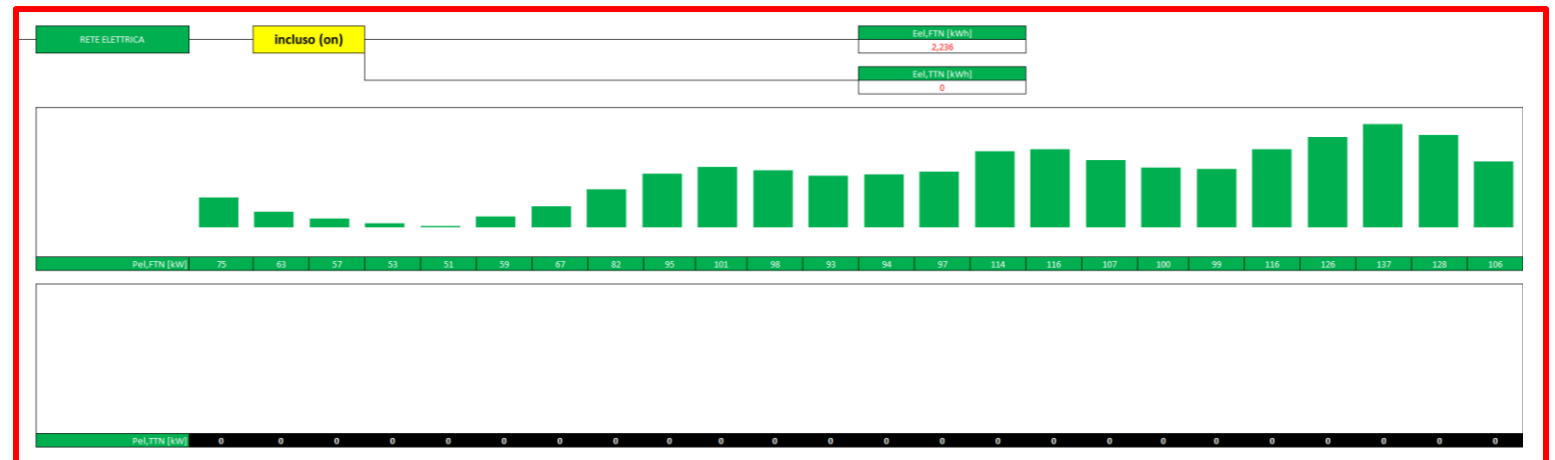
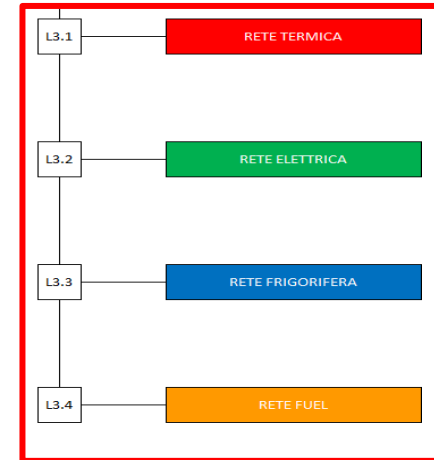
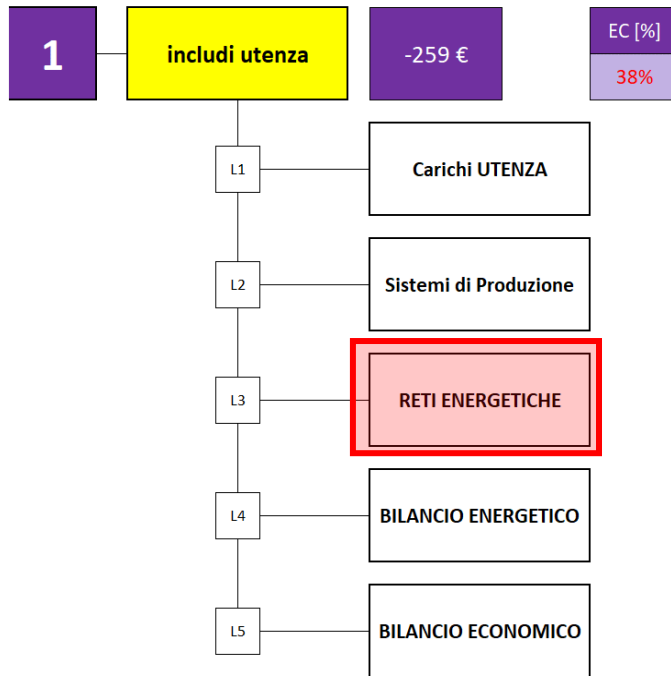
Check Mix Produttivo OK!	PV	escluso	ST	incluso (on)	FR-ASS	escluso
	CG	escluso	PdC	escluso	FR-CMP	incluso (on)
	ORC	escluso	R-TH	ESCLUDI IMMISSIONE		
			R-TH	NO SCAMBIO SUL POSTO		

LOGICA DI UTILIZZO

ORC	FABBISOGNO ELETTRICO	PdC	SURPLUS ELETTRICO	FR-ASS	FABBISOGNO FRIGO		
				FR-CMP	FABBISOGNO FRIGO		
R-EL	incluso (on)	R-TH	incluso (on)	R-FR	incluso (on)	R-FUEL	incluso (on)

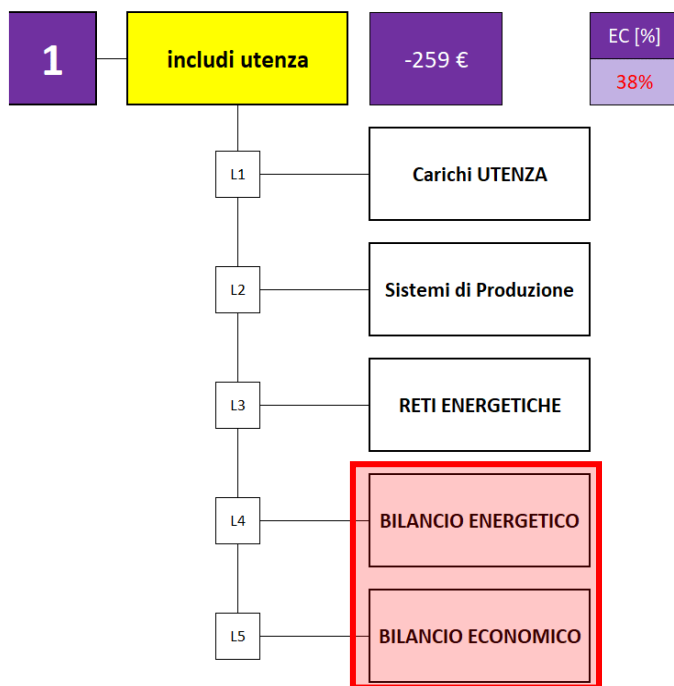
SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software



SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

ECOS 7.1 – Energy Communities Optimizer Software



EC [%]
38%

Extra-Costo

APth [%]	100%
APel [%]	0%
APfr [%]	100%
APfuel [%]	0%

Auto Produzione

QRth [%]	100%
QRel [%]	0%
QRfr [%]	0%
QRfuel [%]	0%

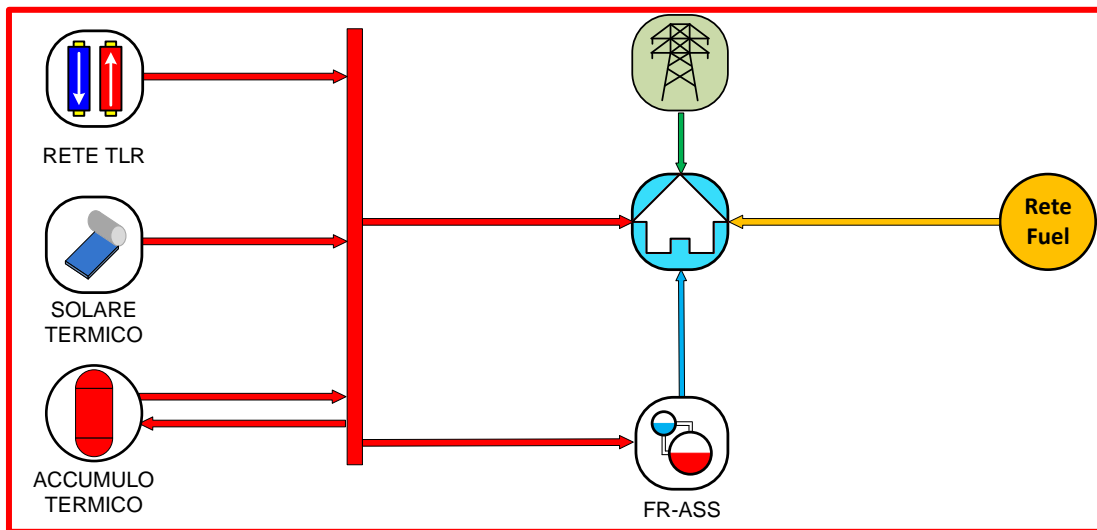
Quota Rinnovabile

RISULTATI

RSEth,tot [€]	0	Eth,R-UT [kWh]	359	Eth,R-tot [kWh]	359	Eth,P-tot [kWh]	415
RSEel,tot [€]	-257	Eel,R-UT [kWh]	1,258	Eel,R-tot [kWh]	2,236	Eel,P-tot [kWh]	0
RSEfr,tot [€]	0	Efr,R-UT [kWh]	3,911	Efr,R-tot [kWh]	3,911	Efr,P-tot [kWh]	3,911
RSEfuel,tot [€]	-2	Efuel,R-UT [kWh]	49	Efuel,R-tot [kWh]	49	Efuel,P-tot [kWh]	0
Eth,P-acc [kWh]	211	Eth,FTN [kWh]	0	Eth,TTN [kWh]	0	Check Eth [kWh]	0.000
Eth,I-acc [kWh]	214	Eel,FTN [kWh]	2,236	Eel,TTN [kWh]	0	Check Eel [kWh]	0.000
Eth,D-acc [kWh]	53	Efr,FTN [kWh]	0	Eth,TTN [kWh]	0	Check Efr [kWh]	0.000
Eth,acc [kWh]	2	Efuel,FTN [kWh]	49	Efuel,TTN [kWh]	0	Check Efuel [kWh]	0.000

SVILUPPO DI UN MODELLO DI CALCOLO DI RETE ENERGETICA COMPLESSA

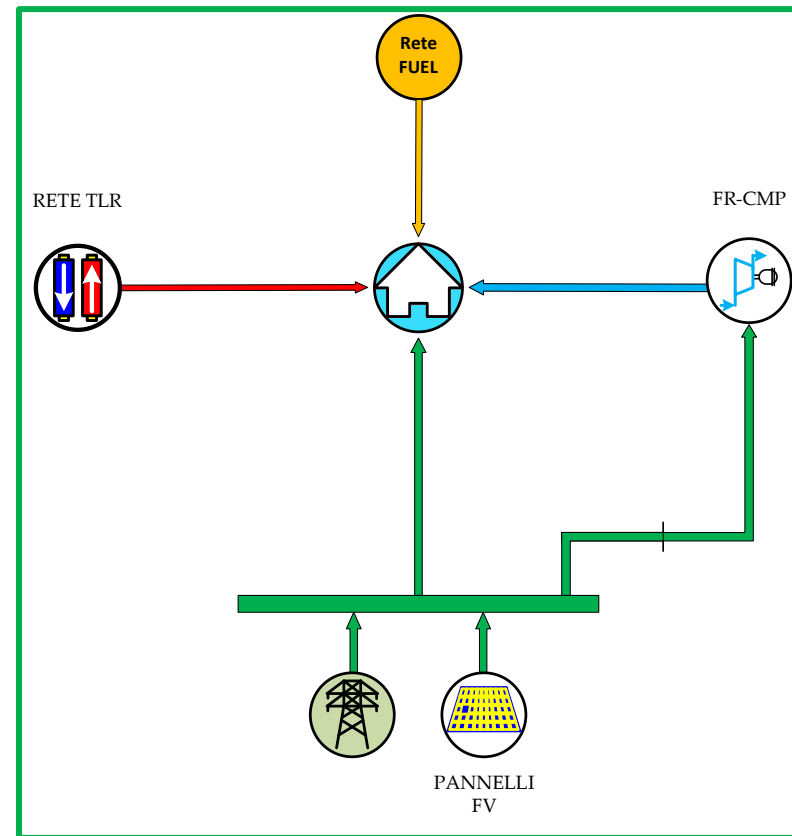
ECOS 7.1 – Energy Communities Optimizer Software – POSSIBILI APPLICAZIONI FUTURE



SOLARE TERMICO + FRIGORIFERO AD ASSORBIMENTO

VS

FOTOVOLTAICO + FRIGORIFERO A COMPRESSIONE



Grazie per l'attenzione